FIG. 1

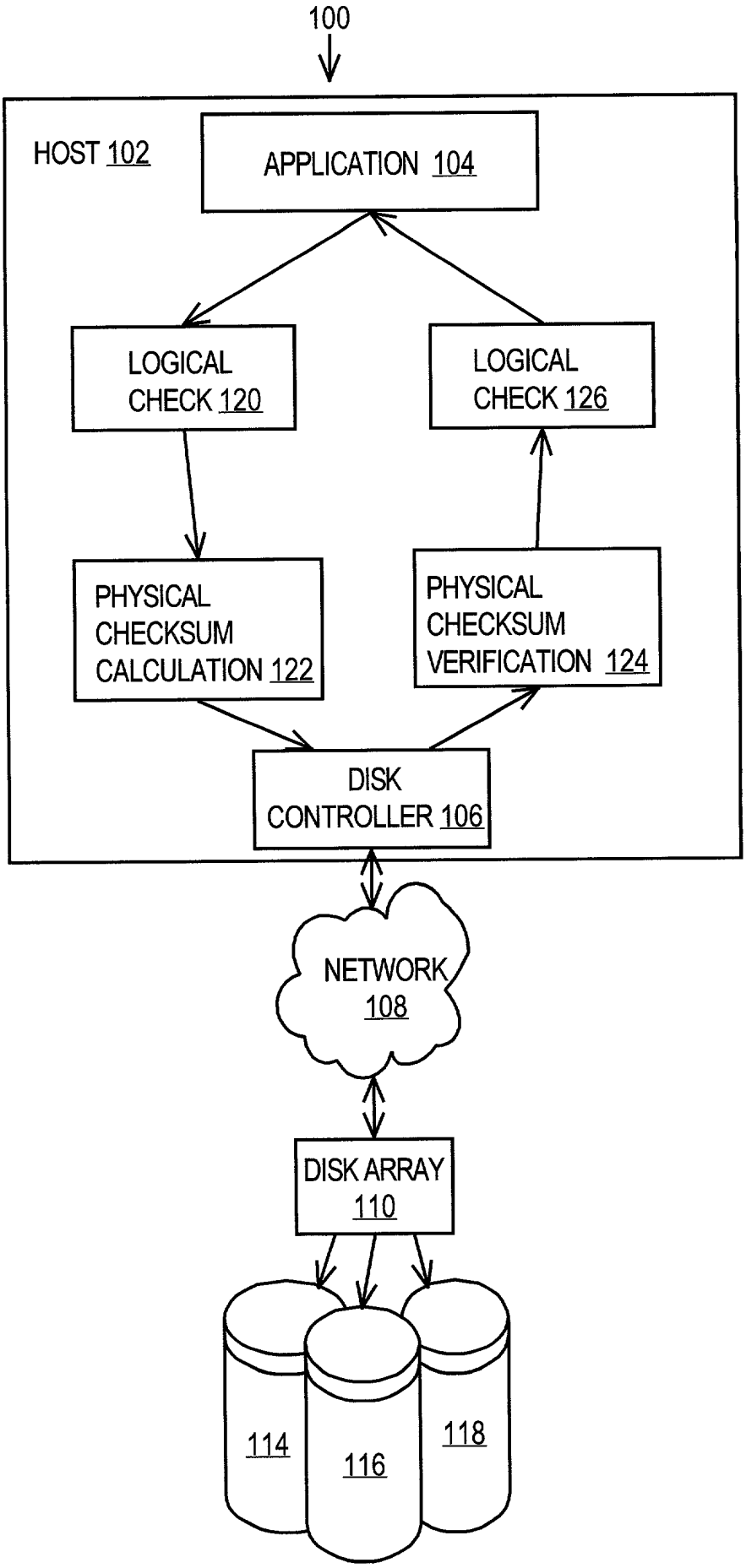

100
HOST 102
APPLICATION 104
LOGICAL CHECK 120
LOGICAL CHECK 126
PHYSICAL CHECKSUM CALCULATION 122
PHYSICAL CHECKSUM VERIFICATION 124
DISK CONTROLLER 106
NETWORK 108
DISK ARRAY 110
114
116
118

FIG. 2

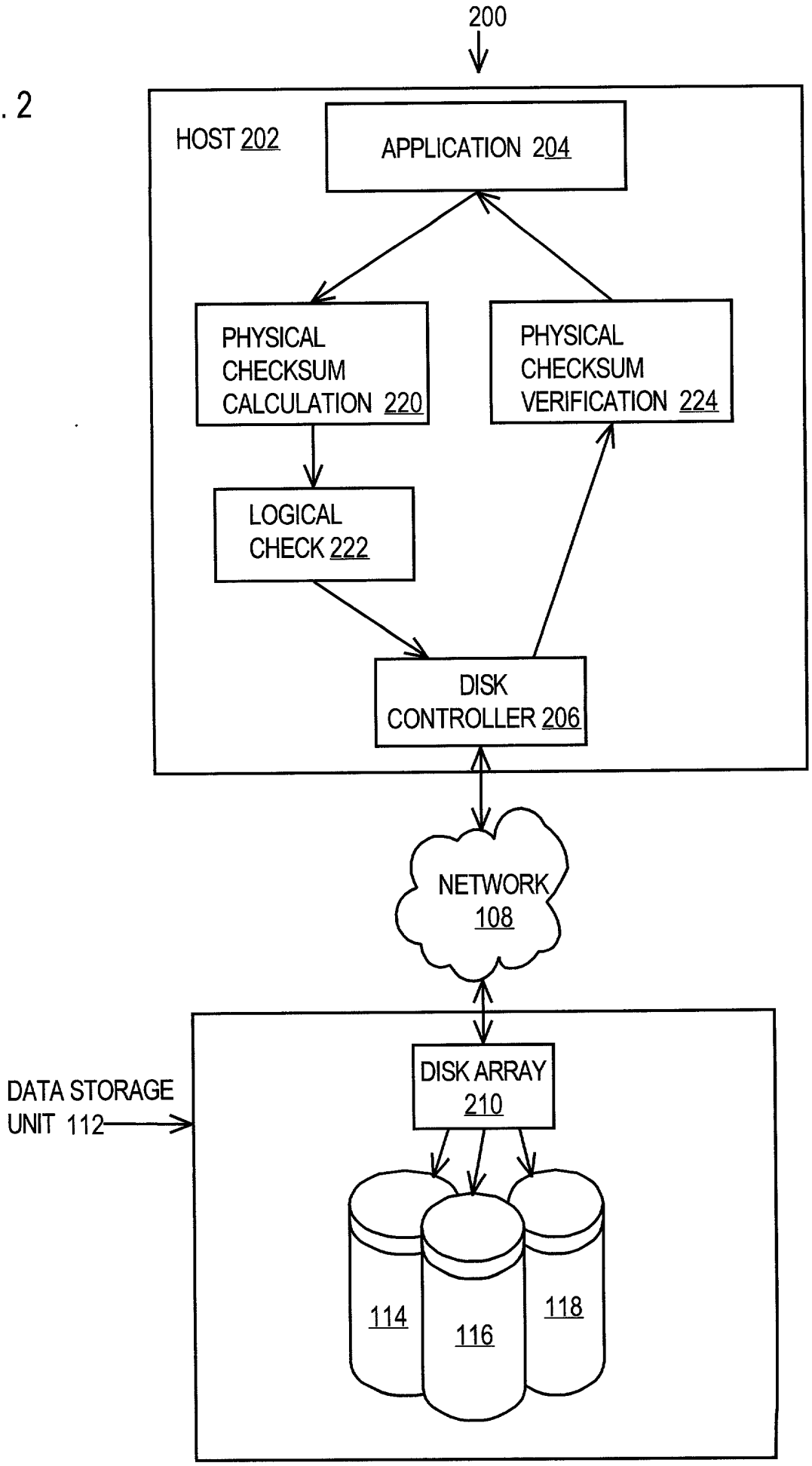

200
HOST 202
APPLICATION 204
PHYSICAL CHECKSUM CALCULATION 220
PHYSICAL CHECKSUM VERIFICATION 224
LOGICAL CHECK 222
DISK CONTROLLER 206
NETWORK 108
DISK ARRAY 210
DATA STORAGE UNIT 112
114
116
118

FIG. 3A

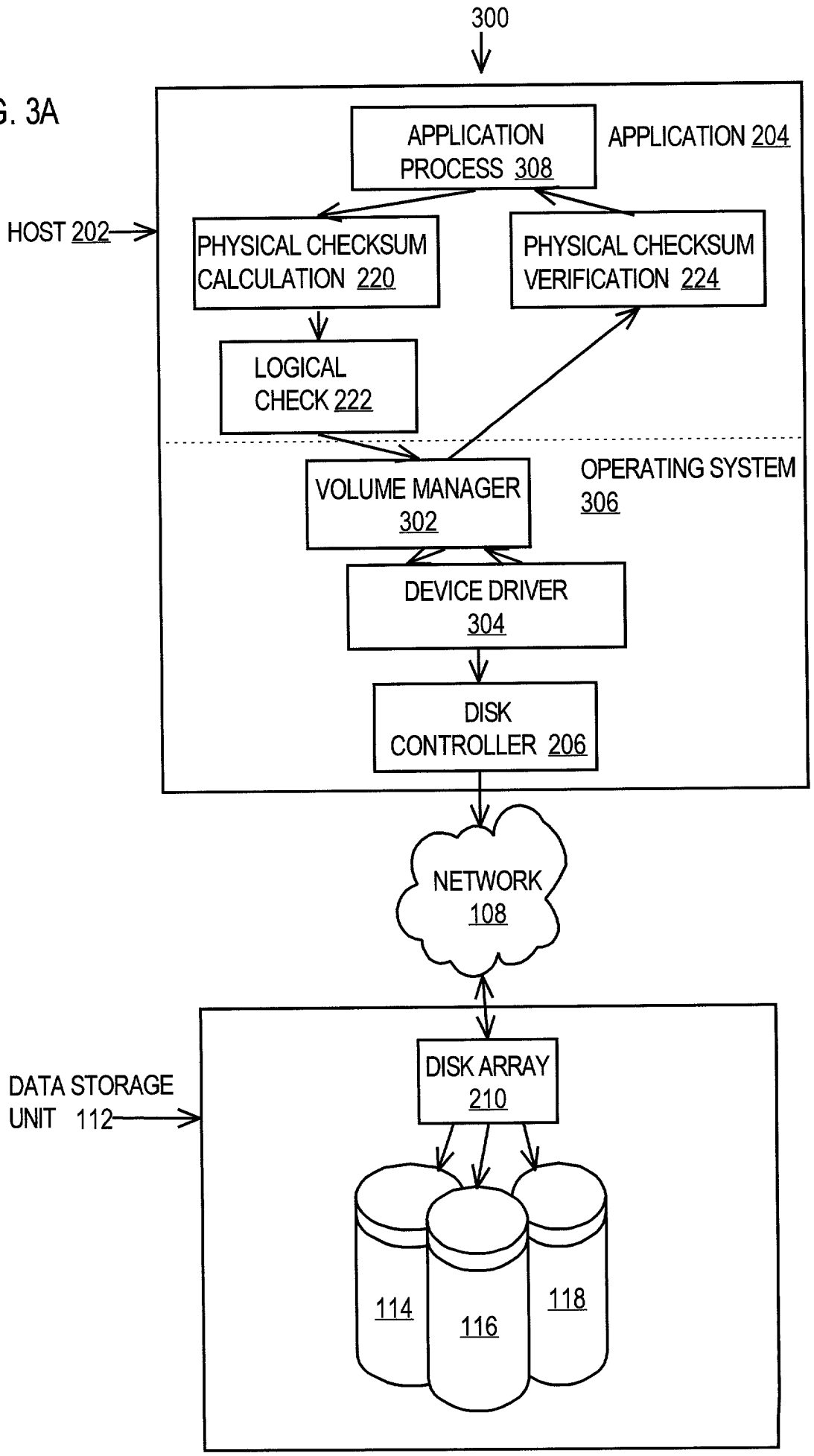
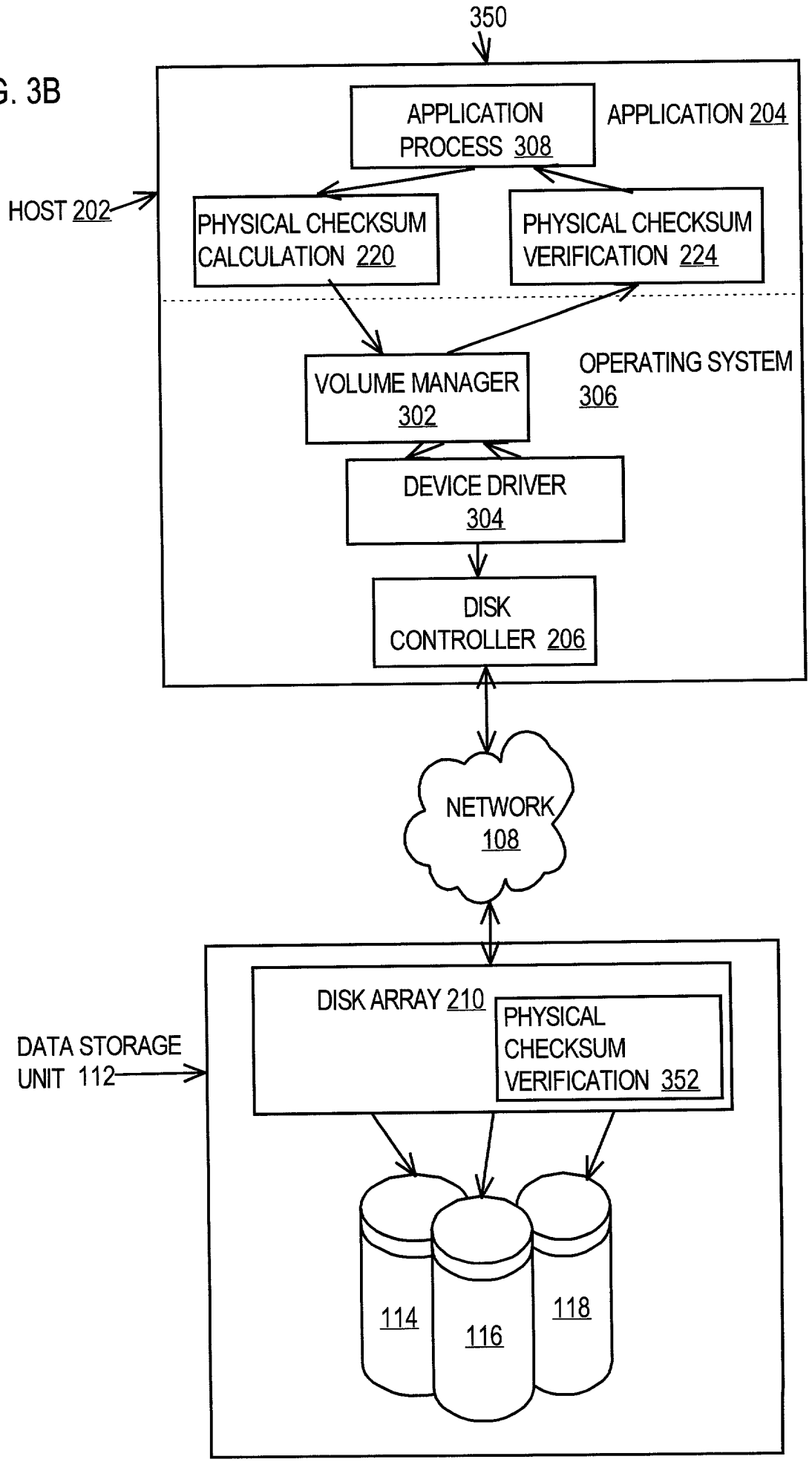

300
APPLICATION PROCESS 308
APPLICATION 204
HOST 202
PHYSICAL CHECKSUM CALCULATION 220
PHYSICAL CHECKSUM VERIFICATION 224
LOGICAL CHECK 222
VOLUME MANAGER 302
OPERATING SYSTEM 306
DEVICE DRIVER 304
DISK CONTROLLER 206
NETWORK 108
DISK ARRAY 210
DATA STORAGE UNIT 112
114
116
118

FIG. 3B


350
APPLICATION PROCESS 308
APPLICATION 204
HOST 202
PHYSICAL CHECKSUM CALCULATION 220
PHYSICAL CHECKSUM VERIFICATION 224
VOLUME MANAGER 302
OPERATING SYSTEM 306
DEVICE DRIVER 304
DISK CONTROLLER 206
NETWORK 108
DISK ARRAY 210
PHYSICAL CHECKSUM VERIFICATION 352
DATA STORAGE UNIT 112
114
116
118

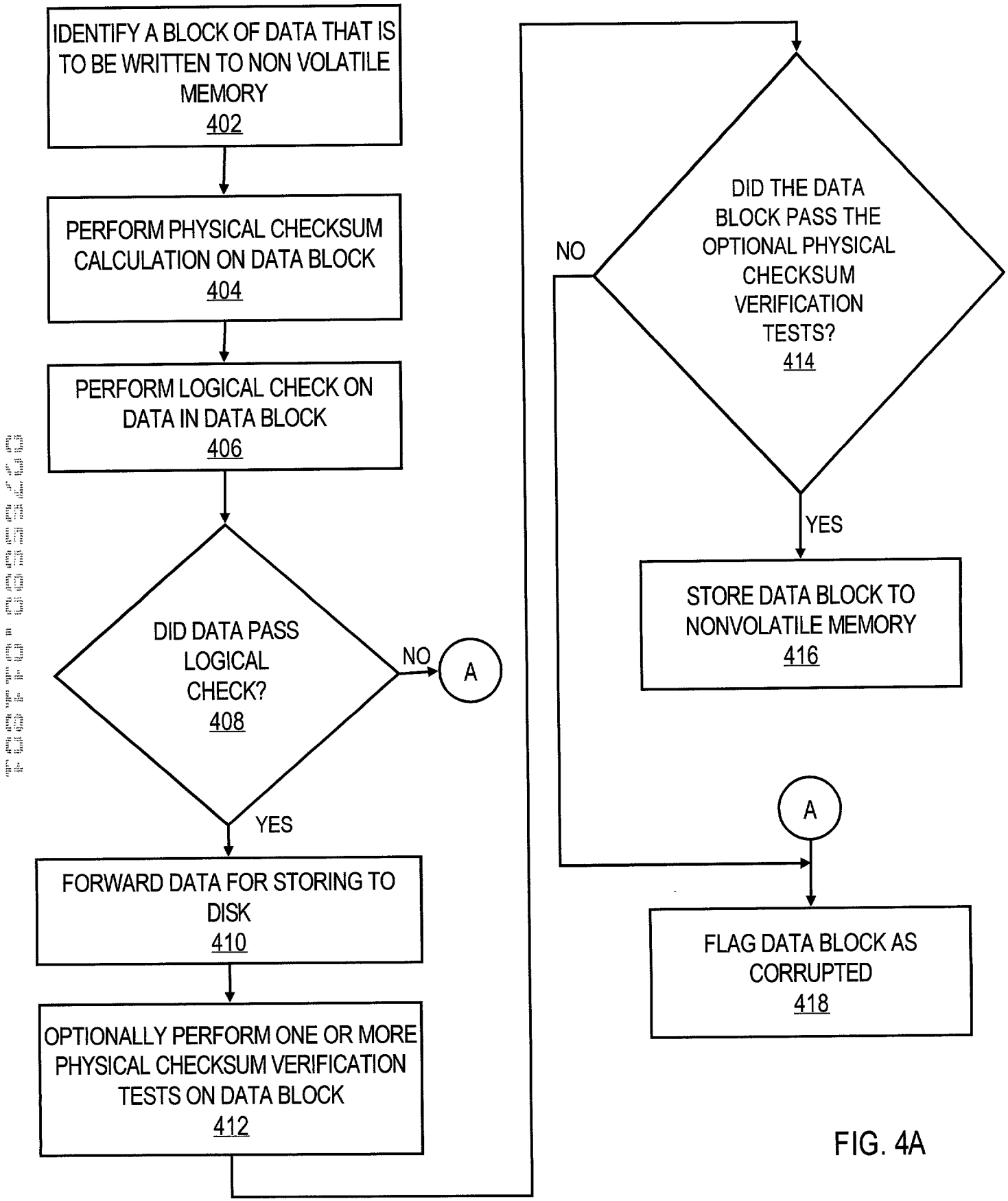

IDENTIFY A BLOCK OF DATA THAT IS TO BE WRITTEN TO NON VOLATILE MEMORY
402
PERFORM PHYSICAL CHECKSUM CALCULATION ON DATA BLOCK
404
PERFORM LOGICAL CHECK ON DATA IN DATA BLOCK
406
DID DATA PASS LOGICAL CHECK?
408
NO
A
YES
FORWARD DATA FOR STORING TO DISK
410
OPTIONALLY PERFORM ONE OR MORE PHYSICAL CHECKSUM VERIFICATION TESTS ON DATA BLOCK
412
DID THE DATA BLOCK PASS THE OPTIONAL PHYSICAL CHECKSUM VERIFICATION TESTS?
414
NO
YES
STORE DATA BLOCK TO NONVOLATILE MEMORY
416
A
FLAG DATA BLOCK AS CORRUPTED
418

FIG. 4A

FIG. 4B

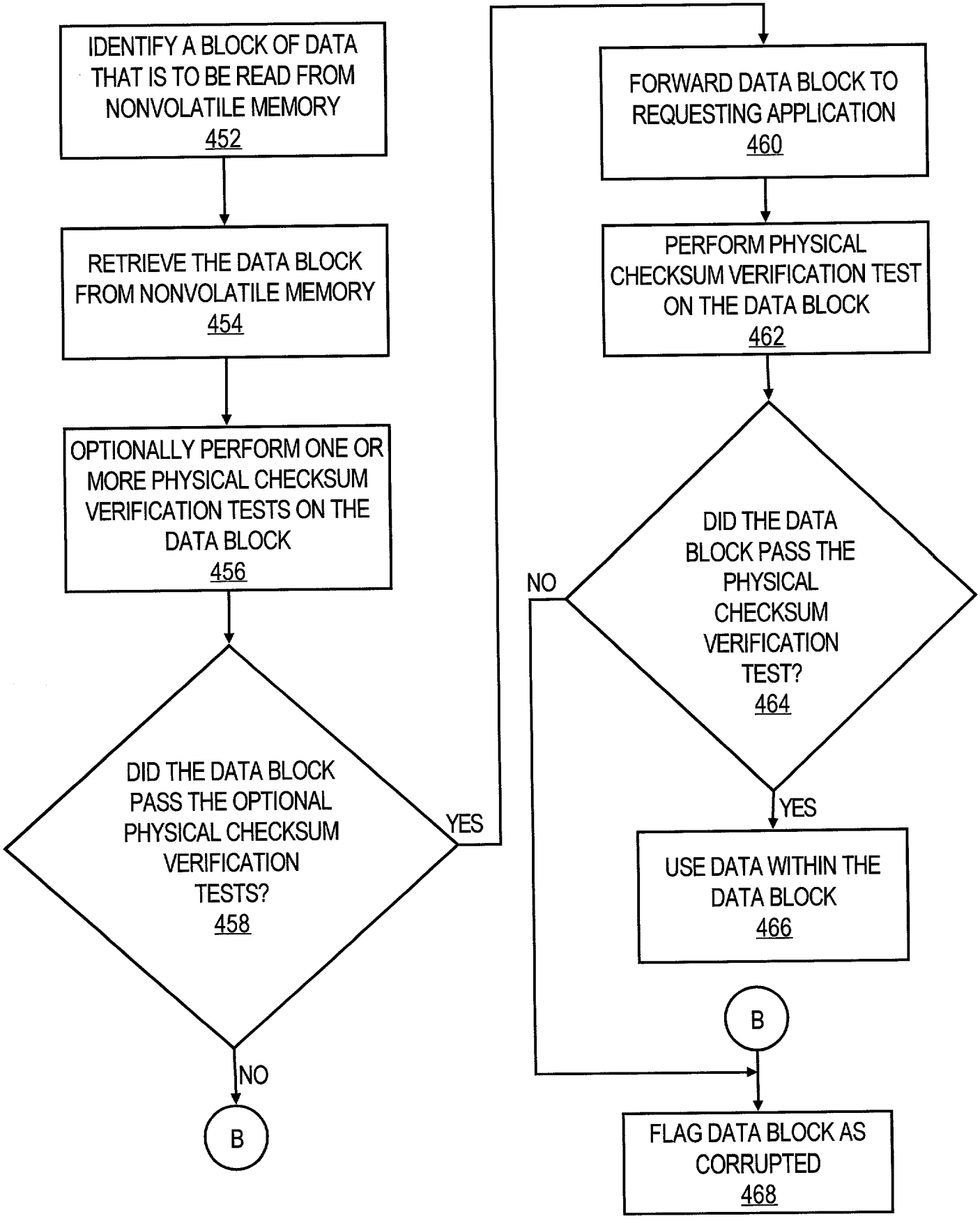

IDENTIFY A BLOCK OF DATA THAT IS TO BE READ FROM NONVOLATILE MEMORY
452
RETRIEVE THE DATA BLOCK FROM NONVOLATILE MEMORY
454
OPTIONALLY PERFORM ONE OR MORE PHYSICAL CHECKSUM VERIFICATION TESTS ON THE DATA BLOCK
456
DID THE DATA BLOCK PASS THE OPTIONAL PHYSICAL CHECKSUM VERIFICATION TESTS?
458
YES
NO
B
FORWARD DATA BLOCK TO REQUESTING APPLICATION
460
PERFORM PHYSICAL CHECKSUM VERIFICATION TEST ON THE DATA BLOCK
462
DID THE DATA BLOCK PASS THE PHYSICAL CHECKSUM VERIFICATION TEST?
464
NO
YES
USE DATA WITHIN THE DATA BLOCK
466
B
FLAG DATA BLOCK AS CORRUPTED
468

FIG. 5

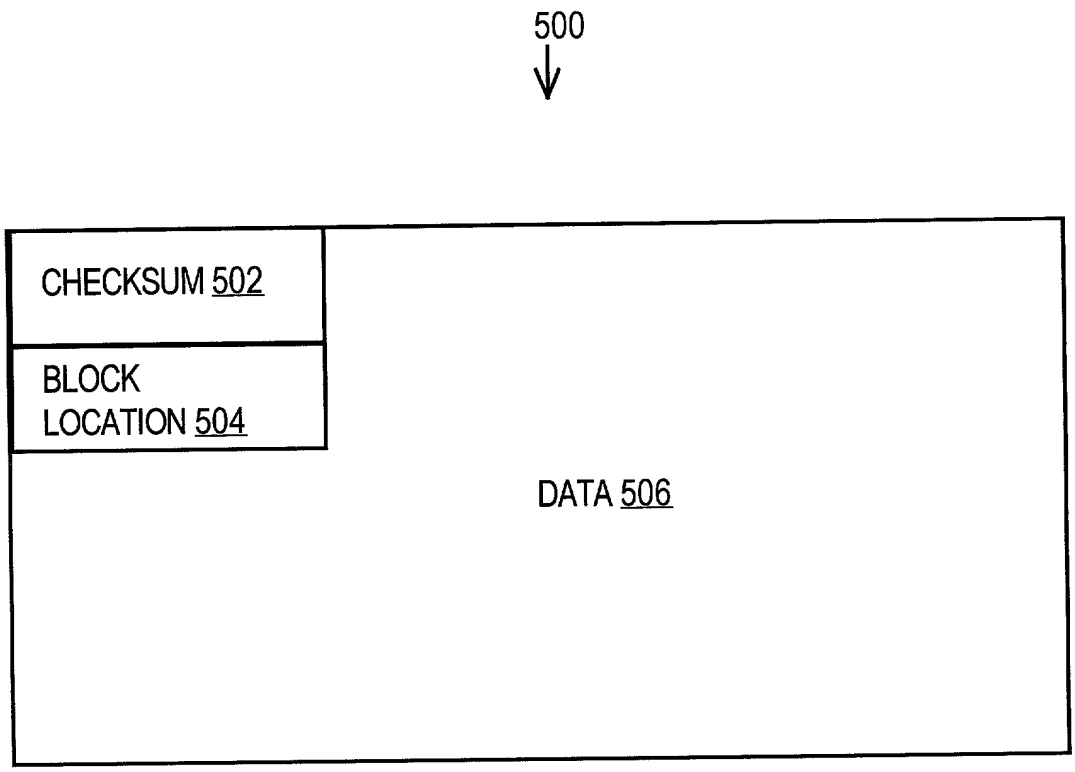
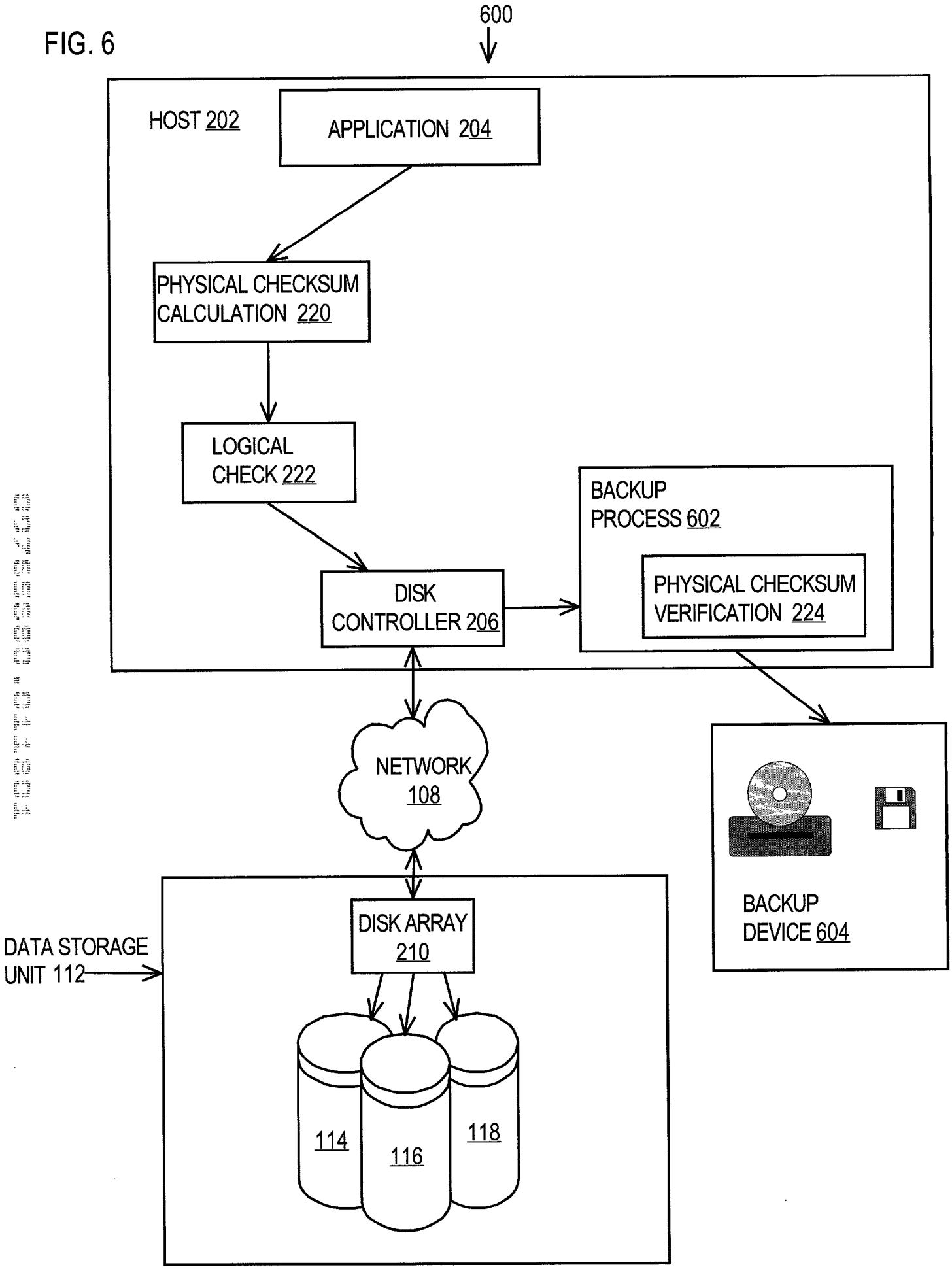


FIG. 6


600
HOST 202
APPLICATION 204
PHYSICAL CHECKSUM CALCULATION 220
LOGICAL CHECK 222
DISK CONTROLLER 206
BACKUP PROCESS 602
PHYSICAL CHECKSUM VERIFICATION 224
NETWORK 108
BACKUP DEVICE 604
DISK ARRAY 210
DATA STORAGE UNIT 112
114
116
118

PCT/US2003/000000

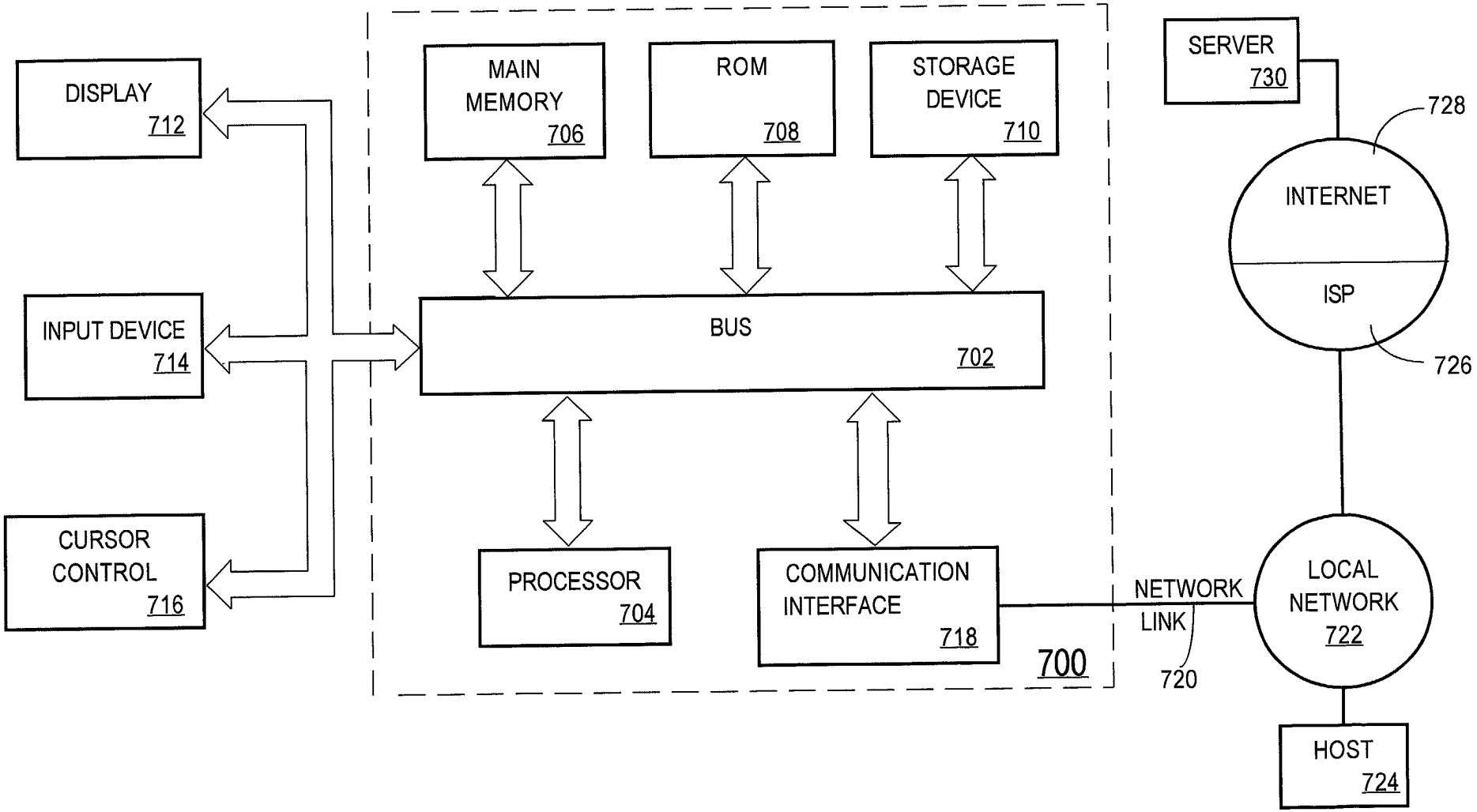



FIG. 7